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Analysis of Digital Preservation Course Offerings in ALA Accredited Graduate Programs

By Elizabeth La Beaud

Master's Research Project

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Introduction

The emergence of the Internet and commonplace computers has led to the revolution of the digital age. Anyone with Internet access can be a content creator, and many people expect information to be instantly available at their fingertips. The challenge for digital archivists is how to provide access, and more importantly, preserve the incredible amount of digitized and born-digital (originally created in digital form) material available today. With the constant influx of new technologies and obsolescence of old technologies, keeping up with the challenges of digital preservation is a full-time occupation.

Institutions have a large investment in digital preservation education as many organizations are charged with providing long-term access to digital objects either through organizational, if not legal, mandates. Many granting agencies now require data management or digital preservation plans, ensuring that the resulting projects are sustainable. Thus, many scholars have issued a call to action to address the educational needs of digital archivists and the vital role they fill for their organizations. As digital preservation is a rapidly evolving area of librarianship, effective education of digital archivists is a moving target. Scholars are taking note of the challenges in training digital archivists as new tools are being developed. Courses and curricula are constantly being updated to ensure the latest and greatest tools and concepts are being addressed. Training the next generation of digital archivists requires continuous education on the part of the archivist, and constant updating and revising curricula on the part of LIS programs to keep up with the fast-paced evolution of digital objects.

Problem Statement

Digital preservation is rapidly becoming a top priority for institutions obligated to provide long-term access to digital objects. Institutions such as the Society of

American Archivists (SAA), LYRASIS, Online Computer Library Center (OCLC), the Library of Congress, and the Northeast Document Conservation Center (NEDCC) provide continuing education in digital preservation for those already in the field, but it begs the question what are library schools teaching in terms of digital preservation to the next generation of digital archivists? The American Library Association (ALA) tracks any specializations or certificate programs being offered from their accredited institutions, but according to its records, there is not a distinct digital preservation focus.

This study seeks to determine which ALA-accredited institutions offer digital preservation courses and analyze the syllabi to identify what is being taught about digital preservation, whether there are any commonalities, and evaluate the curriculum according to the five areas of digital preservation as outlined by the National Digital Stewardship Alliance (NDSA).

Research Questions

R1. What ALA-accredited institutions offer graduate-level courses in digital preservation?
R2. What do those courses offer according to their syllabi and are there any commonalities between programs?
R3. To what extent does the curriculum cover the five areas of digital preservation as outlined by NDSA including

- File fixity and data integrity
- File format sustainability
- Information security
- Metadata
- Storage and geographic location.

Definitions

The Dictionary for Library and Information Science (ODLIS, 2015) gives the following definitions for the terms below.

Digital Preservation

The process of maintaining, in a condition suitable for use, materials produced in digital formats,

including preservation of the bit stream and the continued ability to render or display the content represented by the bitstream. The task is compounded by the fact that some digital storage media deteriorate quickly ("bit rot"), and the digital object is inextricably entwined with its access environment (software and hardware), which is evolving in a continuous cycle of innovation and obsolescence. Also refers to the practice of digitizing materials originally produced in nondigital formats (print, film, etc.) to prevent permanent loss due to deterioration of the physical medium.

Digital Curation

The active management, enhancement, and preservation of trustworthy digital research data for the duration of its lifecycle. Digital curation entails verification of the integrity of digital data, selection of authoritative digital data for its long-term value, the creation of digital objects and associated metadata, transfer of digital objects to reliable digital repositories for secure storage, provision of access to designated users, and periodic re-evaluation of digital formats to avoid obsolescence. For the purposes of this study, digital preservation and digital curation are used interchangeably.

Limitations of the Study

This study was limited to syllabi from ALA-accredited programs in the United States and the District of Columbia. It was further limited to syllabi written in the English language and publicly available online. Only dedicated classes with digital preservation or closely related terms in the title or class description were collected for this study.

Assumptions

The following assumptions were made while conducting this study.

- It is assumed collected data for the purposes of this study are correct and reliable.
- It is assumed all available syllabi online represents the current curriculum.
- It is assumed the program's course description list is an accurate listing of all actively taught courses.
- It is assumed if a given topic is covered in the course, it will be stated in the syllabus.

- It is assumed the material presented in the syllabus is taught in the course without deviation and educational outcomes were achieved.

Importance of the Study

This study provides a comprehensive look at ALA accredited digital preservation courses and illustrate to what extent graduate course curricula align with objectives of the NDSA. This study builds on the available research of single institutions and applies a national view of digital preservation for the education of digital archivists.

Literature Review

Scholars have looked a variety of topics concerning digital preservation, digital libraries, and the education of digital archivists. The following literature review examines case studies of accredited institutions offering digital preservation courses, international perspectives on digital library curriculum, and collaborations for continuing education in digital preservation topics. Lastly, this review looks at surveys and content analysis of syllabi to address digital preservation readiness of graduates and the content of data curation classes to build the structure of this study.

Accredited Institutions' Case Studies

Lin and Abels (2010) posit digital library education should no longer be a specialty but an integrated part of LIS education much like reference or cataloging courses. Many educators take the opportunity while revamping their curriculum to include a digital lab component, and Lin and Abels (2010) are no exception. Their work at Drexel University with the Internet Public Library created an online laboratory to provide hands-on experience a "balance of theory and practice" (Lin & Abels, 2010, p. 120) for LIS students. The online lab allows students to work in a structured, live environment gaining experience with metadata evaluation, collaborative interface design, and digital reference services. Lin and Abels (2010) also note the online format does away with physical boundaries, stating "a collaborative digital lab would be beneficial to multiple LIS schools and digital library education as a whole" (p. 124).

Other programs have also incorporated digital lab components in their curricula. The University of Arizona's School of Information Resources and Library Science (SIRLS) created a specialization known as "DigIn" or Digital Information Management in 2006 (Fulton, Botticello, & Bradley, 2011). The certificate program aims to teach applied technology and digital curation through a digital lab built for both physical and virtual students. Their goal "was to enable a broad range of information professionals to gain an essential level of fluency or literacy with the advanced technologies needed for curation, especially server-based repository applications and Web-based content management systems" (Fulton, et al., 2011, p. 97), not teach to a specific system. The curriculum includes courses in digital collections, applied technologies, managing digital environments, digital preservation, and a capstone course which provides practical experience in an internship-like setting (Fulton, et al., 2011, p. 99-100). More courses are expected to be added and redesigned as the program continues to grow, emphasizing the continuous nature of digital preservation education.

The University of Michigan's School of Information updated its curriculum with the formation of a Preservation of Information specialization. Yakel, Conway, Hedstrom, and Wallace (2011) postulate a new generation of digital archivists or digital curators is needed to care for the increasing amount of born-digital and digitally reformatted material. The specialization should include internships and technological infrastructure in the form of a virtual lab, which will "establish platform independence (e.g., MAC, PC) for preservation-oriented software systems and to enable students to use the application in a classroom setting or remotely on campus or at home" (Yakel et al., 2011, p. 27).

Simmons College has also implemented a digital lab entitled the Digital Curriculum Laboratory (DCL) as explained by Harvey and Bastian (2012). Educators recognized the need for hands-on education and incorporated DCL modules into digital curation courses. As part of Preservation and Digital Stewardship track, students work through scenarios such as migrating and verifying files, assessing the robustness of file formats, and building a Web

archive using the DCL education (Harvey & Bastian, 2012). As multiple institutions have illustrated, the need for hands-on applications and practical experience are driving the restructuring of digital preservation.

International Digital Preservation Education

Internationally, scholars are studying digital library and digital preservation education. Abrizah, Noorhidawati, Hilmi, and Azwana (2009) looked at digital library courses in highly ranked and accredited LIS programs in the United Kingdom, the United States, and universities in Australia, New Zealand, and Canada. The authors categorized the courses into one of three categories: standalone or full digital library course, digital library course integrated with other topics, and closely related content such as digital curation or digitization. Thirteen courses were identified: 6 full courses, 3 integrated courses, and 4 closely related courses. The authors concluded digital library education is "visibly present" (p.91) is highly rated and accredited LIS programs. "The curriculum design and focused teaching areas appear systematic and comprehensive, based on a combination of theory and practice. Although a standard, optimized model of best practice in DL education has not yet emerged, there is progress in this area" (Abrizah et al., 2009, p. 91). Abrizah et al. (2009) suggest LIS educators explore establishing a standard for digital library education.

In Iran, Rasuli and Naghshineh (2014) conducted a survey to solicit viewpoints of a standalone digital library education program in Iran as well as the current state of the LIS curriculum. The authors received responses to their online survey from 45 LIS educators and 66 academic librarians. Open-ended responses were analyzed using content analysis and closed responses were analyzed by descriptive statistics. The authors found that current LIS education is not sufficient in teaching digital library principles to students and librarians in Iran, though the notion of a standalone digital library program was found to be well supported. Program content is suggested to include digital library management, digital preservation, digitization, digital library architecture, and metadata (Rasuli & Naghshineh, 2014, p. 58-59).

The authors concluded more research on digital library education is needed in Iran as this is the first study of its kind.

In Europe, Strathmann and Oßwald (2012) explained the efforts of the Network of Expertise in long-term STOrage of digital Resources (Nestor). Active in Germany, Austria, and Switzerland, Nestor formed a Memorandum of Understanding (MoU) to develop course materials, seminars, schools, publications, and online tutorials to form a cooperative curriculum for digital preservation. Nestor's MoU found online tutorials, when presented as standalone entities, fail due to content obsolescence and lack of updating from content creators, but publications supported by Nestor and other organizations were successful. Strathmann and Oßwald (2012) found shared digital preservation curriculum is having success. No entity can support the curriculum by itself, so the MoU's thirteen higher education institutions work together to improve courses and bring attention to the importance of digital preservation training both within Nestor and beyond.

Surveys and Content Analyses

The coverage of digital preservation education research in North America, beyond single institutions' case studies, illustrates needs assessments, surveys on digital preservation readiness of graduates, and analysis of the syllabi of data curation classes. Gracy and Croft (2006) assess the preservation education available in graduate programs in North America via surveys. Educators were asked about the digital preservation courses offered, the content of the coursework, future plans for the curriculum, internships offered, and post-graduation employment data. The authors note while enrollment numbers are increasing, the resources allocated including faculty and new courses are not. Continuing education is required to gain sufficient coverage of digital preservation topics. Coverage of visual materials and audiovisual materials are particularly lacking in higher education (Gracy & Croft, 2006, p. 280). The authors conclude further research is needed to determine the underlying causes and thus identify possible solutions.

Molinaro (2010) discussed typical structures of digital projects, many of which lack digital preservation planning. She posits the largest problem is that institutions do not know what they do not know; making focused continuing education difficult. In 2005, two surveys were conducted on the state of digital preservation readiness in cultural heritage institutions, and the results show less than a third of respondents have policies in place to preserve digital content. Molinaro (2010) cited numerous conferences and iSchools, including the University of Arizona, University of Michigan, and the University of North Carolina Chapel Hill, are offering educational opportunities for graduate students (p. 46). She then called on institutions to partner with education programs to offer digital preservation training and increase awareness of the dangers to digital objects.

Lastly, Harries-Pierce and Liu (2012) surveyed LIS schools in North America via their Web sites to determine what if any data curation courses are offered and if the quantity of courses being offered is enough. The authors state, "In general, based on course descriptions, the digital curation courses focused on the curation of all digital media and included data as a component" (p. 604). The study examined 52 schools and found 16 schools that offered data curation courses. Information was gathered regarding course title, description, education of instructor, mode of instruction, objectives, syllabi, prerequisites, required textbooks, assigned readings, assignments, and projects. Courses entitled digital curation were also examined and found to include data curation as a component. The authors conclude more institutions should offer data curation courses and those that do should collaborate to establish course objectives and outcomes (Harries-Pierce & Liu, 2012).

While individual digital preservation courses in LIS programs have been researched, as Lin and Abels (2010), Fulton, et al. (2011), Yakel et al. (2011), and Harvey and Bastian (2012) illustrate, the research addressing multiple LIS programs either examine digital libraries (Abrizah et al., 2009; Rasuli & Nagheshineh, 2014) or data curation (Harris-Pierce & Liu, 2012).

The body of LIS research seems to be missing an analysis of multiple program syllabi on digital preservation. Thus, this study aims to build on the existing research and add a multi-Institutional viewpoint based on content analysis of available syllabi related to digital preservation.

Methodology

This study is a content analysis of digital preservation courses offered at ALA-accredited Library and Information Science (LIS) schools in the United States.

A list of accredited schools was obtained from ALA's Web site which showed forty-nine actively accredited schools. Institutions with continual or conditional accreditation were considered for inclusion; whereas, institutions with an accreditation withdrawn status were excluded from this study. Each LIS school's Web site was visited and searched (using the Web browser's control+f function) to locate any digital preservation or related courses being offered in the course rotation. The following terms were searched to locate digital preservation or related courses: "digital," "preservation," "curation," "electronic," "records," "data," "management," "metadata," "fixity," "sustain" (for permutations of sustainable and sustainability), "file," "security," and "storage." If the search identified ones of the terms in the title or description, the course description was read to verify the term was used in a digital preservation context and not referring to an unrelated concept (i.e. management of personnel). Falsely identified courses were discarded and not counted in the results.

A course with "digital preservation," or "digital curation," in the title was considered a digital preservation course. Likewise, a course with a term related to the NDSA's digital preservation concepts – storage and geographic location, file fixity and data integrity, information security, metadata, and file format sustainability – in the course title or description was considered a related course. If any digital preservation or related course was identified, a Google site search (site:domain) was performed to locate a publically assessable syllabus.

Only syllabi available on the institution's domain were included in this study. Syllabi located on an individual's domain (i.e. a professor's personal Web site not affiliated with the institution) were excluded. The syllabi content was examined and categorized for the following concepts as outlined by NDSA:

- File fixity and data integrity
- File format sustainability
- Information security
- Metadata
- Storage and geographic location.

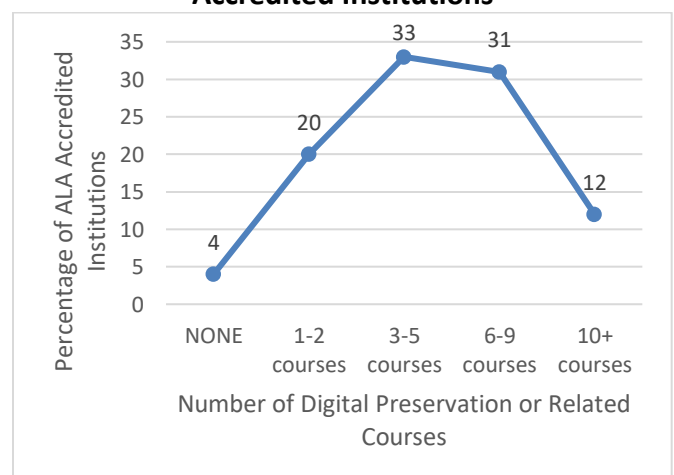
Research was conducted from September 2015 through November 2015. Information for each LIS school was entered into an Excel spreadsheet for analysis and comparison.

Results

R1. What ALA-accredited institutions offer graduate-level courses in digital preservation?

A full list of the forty-nine ALA-accredited institutions, corresponding course titles, and digital preservation concepts addressed are included in Appendix A. Of the forty-nine institutions studied, forty-seven (96%) offer graduate level digital preservation or related courses. Two hundred and sixty-five (265) digital preservation or related courses were identified across the forty-nine institutions. The instances of classes offered at a single institution ranged from one to sixteen courses. The distribution of courses offered at ALA-accredited institutions is plotted below in Figure 1.

Figure 1. Distribution of Number of Courses at ALA-Accredited Institutions



Only two institutions (04%), including East Carolina University in its first year of accreditation, and South Florida University, do not currently offer any digital preservation or related topics in their course rotation.

Ten institutions (20%) offer between one and two digital preservation or related courses as shown in Table 1 below.

Table 1. Institutions Offering 1-2 Digital Preservation or Related Courses

Institution	No. of courses	Digital Preservation Concepts Addressed
Buffalo, University, SUNY	2	Digital preservation
North Carolina at Greensboro, The University of	2	Digital preservation, File format sustainability, Metadata
South Carolina, University of	2	Digital preservation, Metadata
Southern Mississippi, The University of	2	Digital preservation, Metadata
Texas Woman's University	2	Metadata
Alabama, University of	1	Metadata
Clarion University of Pennsylvania	1	Metadata
Rhode Island, University of	1	Digital preservation
St. John's University	1	Digital preservation, File format sustainability, Metadata
Washington, University of	1	Metadata

Seventeen institutions (33%) offer between three and five classes on digital preservation or a related topic as shown in Table 2 below.

Fifteen institutions (31%) offer between six and nine classes on digital preservation or a related topic as shown in Table 3.

Table 2. Institutions Offering 3-5 Digital Preservation or Related Courses

Institution	No. of courses	Digital Preservation Concepts Addressed
Illinois at Urbana-Champaign, University of	5	Digital preservation, File Fixity & Data Integrity, Metadata
Indiana University	5	Digital preservation, Metadata
Iowa, University of	5	Digital preservation, Metadata
Kent State University	5	Digital preservation, Metadata
Queens College, CUNY	5	Digital preservation, File Format Sustainability, Metadata, Storage
Wayne State University	5	Digital preservation, File fixity & Data integrity, Metadata, Storage
Wisconsin-Madison, University of	5	Digital preservation, Metadata
Arizona, University of	4	Digital preservation
Kentucky, University of	4	Digital preservation, Information security, Storage
Rutgers, The State University of New Jersey	4	Digital preservation, Metadata, Storage
Illinois at Urbana-Champaign, University of	5	Digital preservation, File Fixity & Data Integrity, Metadata
St. Catherine University	4	Digital preservation, Information security, Metadata
Wisconsin-Milwaukee, University of	4	Digital preservation, File format sustainability, Information security, Metadata
Florida State University	3	Digital preservation, Information security, Metadata
Louisiana State University	3	Digital preservation, File format sustainability, Metadata
North Carolina Central University	3	Information security, Metadata, Storage
Tennessee, University of	3	Digital preservation, File format sustainability, Storage

Table 3. Institutions offering 6-9 Digital Preservation or Related Courses

Institution	No. of courses	Digital Preservation Concepts Addressed
Albany, University at, SUNY	9	Digital preservation, File format sustainability, Information security, Metadata
Drexel University	9	Digital preservation, Information security, Metadata, Storage
Long Island University	9	Digital preservation, File format sustainability, Metadata, Storage
Pittsburgh, University of	9	Digital preservation, Information security, Metadata, Storage
Hawaii, University of	8	Digital preservation, File fixity & Data integrity, File format sustainability, Metadata, Storage
Michigan, University of	8	Digital preservation, Information security, Metadata, Storage
Emporia State University	7	Digital preservation, File fixity & Data integrity, Metadata, Storage
Simmons College	7	Digital preservation, File format sustainability, Metadata
Denver, University of	6	Digital preservation, File format sustainability, Information security, Metadata
Dominican University	6	Digital preservation, Metadata, Storage
Maryland, University of	6	Digital preservation, File fixity & Data integrity, File format sustainability, Metadata, Storage
North Texas, University of	6	Digital preservation, Information security, Metadata, Storage
Oklahoma, University of	6	Digital preservation, Information security, Storage
Syracuse University	6	Digital preservation, File format sustainability, Information security, Metadata
Valdosta State University	6	Digital preservation, Information security, Metadata, Storage

Six institutions (12%) offer ten or more classes on digital preservation or a related topic as shown in Table 4.

Table 4. Institutions Offering 10 or more Digital Preservation or Related Courses

Institution	No. of courses	Digital Preservation Concepts Addressed
Texas at Austin, University of		Digital preservation, File format sustainability, Information security, Metadata, Storage
California, Los Angeles, University of	14	Digital preservation, File fixity & Data integrity, File format sustainability, Information security, Metadata, Storage
San Jose State University	14	Digital preservation, File fixity & Data integrity, File format sustainability, Information security, Metadata
North Carolina at Chapel Hill, University of	11	Digital preservation, File fixity & Data integrity, Information security, Metadata, Storage
Catholic University of America, The	10	Digital preservation, File fixity & Data integrity, File format sustainability, Metadata, Storage
Pratt Institute	10	Digital preservation, Information security, Metadata, Storage

Overall, the average ALA-accredited program offers five digital preservation or related courses in the curriculum. The University of Texas at Austin offers the most digital preservation or related classes with sixteen courses. On the other end of the spectrum, almost a quarter (24%) offer two or fewer digital preservation or related courses. This could place a large strain on continuing education entities as twenty-four percent of ALA-accredited LIS graduates possibly lack an adequate digital preservation foundation. In a field where the tools change almost daily, not having a solid understanding of digital preservation fundamentals could be a disadvantage to new digital archivists who may require additional training and theory before entering the workplace.

R2: What do those courses offer according to their syllabi and are there any commonalities between programs?

Of the two hundred and sixty-five courses included in this study, one hundred and fifty-three (58%) have a corresponding, publicly available syllabus online. Of the two hundred and sixty-five courses, one hundred and fifty-five (58%) cover digital preservation as a whole compared to the remainder that covers a particular digital preservation related topic. Where possible, the courses that address a specified digital preservation topic have been included in the corresponding segments below.

Digital Preservation

Digital preservation issues are covered in a variety of courses. While there is no majority in what singular course addresses digital preservation, there are some trends. Twenty-four ALA-accredited LIS programs (49%) offer courses with “digital preservation” or “digital curation” in the course title. Additionally, twenty-one institutions (43%) include digital preservation in the discussion of digital libraries, often in addition to digital preservation courses. Institutions also cover digital preservation in electronic records management courses. Seventeen institutions (35%) with ALA-accredited LIS programs, cover digital preservation in records management and electronic records management courses.

Six digital preservation courses in this study (13%) are records management courses. Moreover, four institutions (08%) include digital preservation in traditional archives coursework.

R3. To what extent does the curriculum cover the five areas of digital preservation as outlined by NDSA including

- **File fixity and data integrity**
- **File format sustainability**
- **Information security**
- **Metadata**
- **Storage and geographic location.**

File Fixity and Data Integrity

Nine ALA institutions in the U.S. (18%) offer courses covering file fixity and data integrity (Table 5). Ten classes, out of two hundred and sixty-five (< 04%), cover file fixity and data integrity. The University of North Carolina at Chapel Hill offers two classes that cover file fixity and data integrity. The “Information Assurance” course at UNC at Chapel Hill may be the only course that could be considered a data integrity course. Compared to the remaining topics, file fixity and data integrity appear in the fewest number of courses making it the least covered digital preservation concept in ALA-accredited programs.

Table 5. Courses Covering File Fixity, Data Integrity

Institution	Course Title	Digital Preservation Concepts Addressed
California, Los Angeles, Univ. of	IS 241 Digital Preservation	File Fixity & Data Integrity, Metadata
Catholic Univ. of America	LSC 654: Database Management	File Fixity & Data Integrity, Storage
Emporia State University	LI 848: Issues in Preservation, Access, Digitization	Digital preservation, File Fixity & Data Integrity
Hawaii, University of	LIS 694 Digital Archives and Preservation	Digital preservation, File Fixity & Data Integrity
Illinois at Urbana-Champaign, Univ. of	LIS 586 Digital Preservation	Digital preservation, File Fixity & Data Integrity
Maryland, University of	INST 641: Policy Issues in Digital Curation	Digital preservation, File Fixity & Data Integrity, Information Security
N. Carolina at Chapel Hill, Univ. of	INLS 561: Digital Forensics for Curation of Digital Collections	Digital preservation, File Fixity & Data Integrity, Storage
N. Carolina at Chapel Hill, Univ. of	INLS 566: Information Assurance	File Fixity & Data Integrity, Information Security
San Jose State University	INFO 284. Seminar in Archives and Records Management	Digital preservation, File Fixity & Data Integrity, Information Security, Metadata
Wayne State University	LIS 7910 Digital Curation and Preservation	Digital preservation, File Fixity & Data Integrity, Metadata

File Format Sustainability

Sixteen institutions with ALA-accredited programs (33%) offer courses covering file format sustainability. Nineteen classes discussing file format sustainability (07%) are distributed across the sixteen institutions (Appendix B, Table 6) with the University of Denver, Long Island University, and the University of Texas at Austin each offering two. There are no courses focusing solely on file format sustainability; however, several institutions discuss file format sustainability in the early stages of digital preservation, starting with digitization, such as the University of Denver, Queen's College, San Jose University, and the University of Texas at Austin.

Information Security

Information security issues appear to be covered in ten percent (10%) of digital preservation or related courses (Appendix B, Table 7). Twenty-seven courses, distributed over twenty institutions (41%) with ALA-accredited programs, cover information security. Furthermore, eight out of twenty-seven courses covering information security (30%) could be classified as information security classes. The course titles covering information security range from "Database Security" at Syracuse University, to "Network Security" at North Carolina Central University, or "Principles of Cybersecurity" at Drexel University. Only two universities state "information security" in their course titles – Florida State University and University of Wisconsin-Milwaukee. Similar to the diversity in course titles, there does not appear to be much standardization in how the topic is presented in the course descriptions or syllabi.

Metadata

The majority of digital preservation or related courses (63%) include metadata in their syllabi. Thirty-four (69%) of institutions offer a standalone metadata course in their curricula, and standalone metadata courses make up thirteen (13%) of all the digital preservation related courses. In total, ninety-six courses cover metadata with thirty-five courses displaying the term "metadata" in the title, which suggests an understanding of how integral metadata is in digital preservation (Appendix B, Table 8).

Storage

Twenty-four institutions (49%) offer courses covering storage issues. Several institutions offer multiple courses discussing storage including the University of California, Los Angeles, Dominican University, University of Kentucky, Long Island University, University of North Texas, University of Oklahoma, University of Pittsburgh, and the University of Tennessee. Of the thirty-five courses covering storage, thirty percent cover the topic in either records management or database management. Only one institution, Dominican University, uses the term "storage" in the course title (Appendix B, Table 9).

Conclusion

In summary, the majority of ALA-accredited programs are covering digital preservation or a related topic, although there is little consensus as to what constitutes digital preservation education. The coverage of digital preservation and related topics vary from institution to institution; however, most institutions appear to recognize the importance of metadata to digital preservation as the topic is featured in the majority of syllabi. Comparatively, file fixity and data integrity are allotted the least amount of coverage in the curricula. The large variety of what courses covered and the lack of similarity in offerings is concerning: less than five percent of ALA-accredited institutions cover file fixity and data integrity; only ten percent cover file format sustainability; less than a third cover information security; and less than half cover storage. Other than metadata, there was no majority consensus in the digital preservation related classes. Only one institution in this study explicitly addresses all of the digital preservation fundamentals as outlined by the NDSA: University of California, Los Angeles.

Additional research is needed in digital preservation education. Of the two hundred and sixty-five courses identified in this study, just over half had an available syllabus. This study could be repeated with additional syllabi to have a better representation of the curricula. Additionally, with the fast-changing pace of technology, one has to wonder how often the curriculum should be updated.

School rankings and the distribution of digital preservation courses could be analyzed to determine if there are any correlations between the top-rated LIS programs and how many digital preservation courses they offer.

While more research is needed, the picture depicted in this study indicates a potential strain on continuing education entities, as LIS graduates may not be prepared for the challenges of digital preservation work. This could foreshadow a need for supplementary certifications and endorsements to verify one's knowledge base, and raise the education requirements of those entering the field.

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Appendix A. ALA-Accredited Programs and Courses Related to Digital Preservation

Institution	Course	Digital Preservation Concepts
Alabama, University of (Continued accreditation)	LS 566: Metadata	Metadata
Albany, University at, SUNY (Continued accreditation)	IIST 666: Network and Systems Security	Information security
Albany, University at, SUNY (Continued accreditation)	IIST 666: Digital Libraries	Digital preservation, Metadata
Albany, University at, SUNY (Continued accreditation)	IST 523: Fundamentals of Information Technology	Information security
Albany, University at, SUNY (Continued accreditation)	IST 547: Electronic Records Management	Digital preservation
Albany, University at, SUNY (Continued accreditation)	IST 602: Information and Knowledge Organization	Metadata
Albany, University at, SUNY (Continued accreditation)	IST 653: Digital Libraries	Digital preservation, File format sustainability, Metadata
Albany, University at, SUNY (Continued accreditation)	IST 654: Preservation Management in Archives and Libraries	Digital preservation
Albany, University at, SUNY (Continued accreditation)	IST 656: Archives and Manuscripts	Digital preservation
Albany, University at, SUNY (Continued accreditation)	IST 660: Archival Representation	Metadata
Arizona, University of (Continued accreditation)	LIS 671: Introduction to Digital Collections	Digital preservation
Arizona, University of (Continued accreditation)	LIS 673: Managing the Digital Environment	Digital preservation
Arizona, University of (Continued accreditation)	LIS 674: Preservation of Digital Collections	Digital preservation
Arizona, University of (Continued accreditation)	LIS 675: Advanced Digital Collections	Digital preservation
Buffalo, University at, SUNY (Continued accreditation)	LIS 513: Records Management	Digital preservation
Buffalo, University at, SUNY (Continued accreditation)	LIS 519: Selection, Acquisition and Management of Non-Book Materials	Digital preservation
California, Los Angeles, University of (Continued accreditation)	262A: Data Management and Practice	Digital preservation

California, Los Angeles, University of (Continued accreditation)	274: Database Management Systems	Information security, Storage
California, Los Angeles, University of (Continued accreditation)	INF STD 240: Management of Digital Records	Digital preservation, Metadata
California, Los Angeles, University of (Continued accreditation)	IS 241: Digital Preservation	File fixity & data integrity, Metadata
California, Los Angeles, University of (Continued accreditation)	IS 260: Description and Access	Metadata
California, Los Angeles, University of (Continued accreditation)	IS 262B: Data Curation and Policy	Digital preservation
California, Los Angeles, University of (Continued accreditation)	IS 269: Seminar information structure	Metadata
California, Los Angeles, University of (Continued accreditation)	IS 271: Introduction to Computer Systems and Programming	Metadata
California, Los Angeles, University of (Continued accreditation)	IS 289: Seminar Special Issues	Digital preservation
California, Los Angeles, University of (Continued accreditation)	IS 289-1: Digital Preservation	Digital preservation
California, Los Angeles, University of (Continued accreditation)	IS 433: Community-Based Archiving	Digital preservation
California, Los Angeles, University of (Continued accreditation)	IS 464: Metadata	Metadata
California, Los Angeles, University of (Continued accreditation)	MIAS 240: Archival Administration	Digital preservation
California, Los Angeles, University of (Continued accreditation)	MIAS 298: (Special Topics) Digital Asset Management	Digital preservation, File format sustainability, Metadata, Storage
Catholic University of America, The (Continued accreditation)	LSC 615: Metadata	Metadata
Catholic University of America, The (Continued accreditation)	LSC 647: Preservation	Digital preservation
Catholic University of America, The (Continued accreditation)	LSC 648: Digital Curation	Digital preservation
Catholic University of America, The (Continued accreditation)	LSC 652: Foundations of Digital Libraries	Digital preservation, File format sustainability, Metadata
Catholic University of America, The (Continued accreditation)	LSC 654: Database Management	File fixity & data integrity, Storage
Catholic University of America, The (Continued accreditation)	LSC 713: Advanced Cataloging and Classification	Metadata

Catholic University of America, The (Continued accreditation)	LSC 761: Electronic Records and Digital Archives	Digital preservation
Catholic University of America, The (Continued accreditation)	LSC 850: Digital Humanities	Digital preservation
Catholic University of America, The (Continued accreditation)	LSC 877 or CLSC 877: Institute on Digital Collections in Libraries, Archives, and Museums	Digital preservation
Catholic University of America, The (Continued accreditation)	LSC 887 or CLSC 887: Institute on Federal Library Resources	Digital preservation
Clarion University of Pennsylvania (Continued accreditation)	LS 575: Digital Libraries	Metadata
Denver, University of (Continued accreditation)	LIS 4050: Library and Information Technologies	Information security
Denver, University of (Continued accreditation)	LIS 4404 - Metadata Architectures	Metadata
Denver, University of (Continued accreditation)	LIS 4800: Intro Archives & Records Mgmt	Digital preservation
Denver, University of (Continued accreditation)	LIS 4804: Digital Objects & Collections	Digital preservation, File format sustainability, Metadata
Denver, University of (Continued accreditation)	LIS 4810: Digital Libraries	Digital preservation
Denver, University of (Continued accreditation)	LIS 4820: Digitization	Digital preservation, File format sustainability, Metadata
Dominican University (Continued accreditation)	LIS 750: Information Storage and Retrieval	Storage
Dominican University (Continued accreditation)	LIS 751: Database Management	Storage
Dominican University (Continued accreditation)	LIS 759: Digital Libraries	Digital preservation
Dominican University (Continued accreditation)	LIS 882: Metadata for digital resources	Metadata
Dominican University (Continued accreditation)	LIS 886: Records and Information Management	Digital preservation
Dominican University (Continued accreditation)	LIS 889: Digital Curation	Digital preservation
Drexel University (Continued accreditation)	INFO 662: Metadata and Resource Description	Metadata
Drexel University (Continued accreditation)	INFO 517: Principles of Cybersecurity	Information security

Drexel University (Continued accreditation)	INFO 642: Managing Digital Collections and Repositories	Storage
Drexel University (Continued accreditation)	INFO 642: Managing Digital Collections and Repositories	Storage
Drexel University (Continued accreditation)	INFO 653: Digital Libraries	Metadata
Drexel University (Continued accreditation)	INFO 750: Archival Access Systems	Metadata
Drexel University (Continued accreditation)	INFO 753: Introduction to Digital Curation	Digital preservation
Drexel University (Continued accreditation)	INFO 755: Electronic Records Management	Digital preservation
Drexel University (Continued accreditation)	INFO 756: Digital Preservation	Digital preservation
Emporia State University (Continued accreditation)	LI 827: Preservation Strategies	Digital preservation
Emporia State University (Continued accreditation)	LI 848: Issues in Preservation, Access, and Digitization	Digital preservation, File fixity & data integrity
Emporia State University (Continued accreditation)	LI 849: Records and Information Management	Digital preservation
Emporia State University (Continued accreditation)	LI 861: Current Issues in Information Transfer	Digital preservation
Emporia State University (Continued accreditation)	LI 862: Current Issues in Technology	Storage
Emporia State University (Continued accreditation)	LI 883: Introduction to Metadata	Metadata
Emporia State University (Continued accreditation)	LI 884: Advanced Metadata Applications	Metadata
Florida State University (Continued accreditation)	LIS 5472: Digital Libraries	Digital preservation
Florida State University (Continued accreditation)	LIS 5775: Information Security	Information security
Florida State University (Continued accreditation)	LIS 5787: Fundamentals of Metadata Theory and Practice	Metadata
Hawaii, University of (Continued accreditation)	LIS 619: Preservation Management	Digital preservation
Hawaii, University of (Continued accreditation)	LIS 653: Seminar in Archival Studies – Archives and Technology	Digital preservation

Hawaii, University of (Continued accreditation)	LIS 670: Introduction to Information Science and Technology	Storage
Hawaii, University of (Continued accreditation)	LIS 674: Database Design & Creation	Metadata
Hawaii, University of (Continued accreditation)	LIS 694: Digital Archives and Preservation	Digital preservation, File fixity & data integrity
Hawaii, University of (Continued accreditation)	LIS 694: Digital Content Management	Metadata
Hawaii, University of (Continued accreditation)	LIS 694: Metadata Management in Memory Institutions	Metadata
Hawaii, University of (Continued accreditation)	unknown #: Moving Image Archives	Digital preservation, File format sustainability
Illinois at Urbana-Champaign, University of (Continued accreditation)	LIS 507: Intro to Bibliographic Metadata	Metadata
Illinois at Urbana-Champaign, University of (Continued accreditation)	LIS 531: Foundations of Data Curation	Digital preservation, Metadata
Illinois at Urbana-Champaign, University of (Continued accreditation)	LIS 562: Metadata in theory and practice	Metadata
Illinois at Urbana-Champaign, University of (Continued accreditation)	LIS 581: Adm and Use Archival Materials	Digital preservation
Illinois at Urbana-Champaign, University of (Continued accreditation)	LIS 586: Digital Preservation	Digital preservation, File fixity & data integrity
Indiana University (Continued accreditation)	Z581: Archives and Records Management	Digital preservation
Indiana University (Continued accreditation)	Z586: Digital Curation	Digital preservation
Indiana University (Continued accreditation)	Z634: Metadata	Metadata
Indiana University (Continued accreditation)	Z652: Digital Libraries	Metadata
Indiana University (Continued accreditation)	Z685: Electronic Records Management	Digital preservation, Metadata
Iowa, University of (Continued accreditation)	SLIS 4900/021:150 Preservation and Conservation of Collection Materials	Digital preservation
Iowa, University of (Continued accreditation)	SLIS 6140/021:226 Digital Environments	Metadata

Iowa, University of (Continued accreditation)	SLIS: 6330/021:240 Archives and Media	Storage
Iowa, University of (Continued accreditation)	SLIS 6335: Metadata Theories and Applications	Metadata
Iowa, University of (Continued accreditation)	SLIS 6345: Stewardship of Information and Collections	Digital preservation
Kent State University (Continued accreditation)	60633: Digital Curation	Digital preservation
Kent State University (Continued accreditation)	60639: Implementation of Digital Libraries	Metadata
Kent State University (Continued accreditation)	LIS 60631: Introduction to Digital Preservation	Digital preservation
Kent State University (Continued accreditation)	LIS 60637: Metadata Architecture and Implementation	Metadata
Kent State University (Continued accreditation)	LIS 60638: Digital Libraries	Digital preservation
Kentucky, University of (Continued accreditation)	LIS 636: Foundations of Information Technology	Storage
Kentucky, University of (Continued accreditation)	LIS 637: Information Technology	Information security, Storage
Kentucky, University of (Continued accreditation)	LIS 638: Internet Technologies and Information Services	Storage
Kentucky, University of (Continued accreditation)	LIS 653: Preservation Management	Digital preservation
Long Island University (Conditional accreditation)	LIS 508: Technology for Information Management	Storage
Long Island University (Conditional accreditation)	LIS 520: Records Management	Digital preservation
Long Island University (Conditional accreditation)	LIS 654: Building Digital Libraries	Metadata
Long Island University (Conditional accreditation)	LIS 657: Introduction to Preservation	Digital preservation
Long Island University (Conditional accreditation)	LIS 706: Digital Preservation	Digital preservation, File format sustainability, Storage
Long Island University (Conditional accreditation)	LIS 716: Audio Preservation	File format sustainability
Long Island University (Conditional accreditation)	LIS 722: Digital Records	Digital preservation

Long Island University (Conditional accreditation)	LIS 763: Metadata for Digital Libraries	Metadata
Long Island University (Conditional accreditation)	LIS 768: Digital Information Representation	Metadata
Louisiana State University (Continued accreditation)	LIS 7410: Digital Libraries	Digital preservation, File format sustainability, Metadata
Louisiana State University (Continued accreditation)	LIS 7505: Introduction to Digital Curation	Digital preservation
Louisiana State University (Continued accreditation)	LIS 7611: Management of Electronic Records	Digital preservation
Maryland, University of (Continued accreditation)	INST 611: Privacy and Security in a Networked World	Information security
Maryland, University of (Continued accreditation)	INST 641: Policy Issues in Digital Curation	Digital preservation, File fixity & data integrity, Information security
Maryland, University of (Continued accreditation)	INST 729: "Follow the Fringe: Documentation and Preservation of Cultural Movements in Media	Metadata
Maryland, University of (Continued accreditation)	LBSC 682: Management of Electronic Records & Information	Digital preservation, Storage
Maryland, University of (Continued accreditation)	LBSC 708Q 0101: Digital Preservation	Digital preservation
Maryland, University of (Continued accreditation)	LBSC 786: Library and Archives Preservation	Metadata
Michigan, University of (Continued accreditation)	SI 625: Digital Preservation	Digital preservation
Michigan, University of (Continued accreditation)	SI 502: Networked Computing Storage Communication and Processing	Information security
Michigan, University of (Continued accreditation)	SI 581: Preservation Administration	Digital preservation
Michigan, University of (Continued accreditation)	SI 603: Economics of Sustainable Digital Information	Digital preservation
Michigan, University of (Continued accreditation)	SI 639: Web Archiving	Digital preservation
Michigan, University of (Continued accreditation)	SI 640: Digital Libraries and Archives	Digital preservation
Michigan, University of (Continued accreditation)	SI 675: Digitization Cultural Heritage Materials	Metadata
Michigan, University of (Continued accreditation)	SI 678: Preserving Sound and Motion	Storage

North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 465: Understanding Information Technology for Managing Digital Collections	Digital preservation
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 525: Electronic Records Management	Digital preservation
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 540: Building a Personal Digital Library	Metadata
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 556: Introduction to Archives and Records Management	Digital preservation
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 561: Digital Forensics for Curation of Digital Collections	Digital preservation, File fixity & data integrity, Storage
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 566: Information Assurance	File fixity & data integrity, Information security
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 624: Policy-Based Data Management	Digital preservation
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 720: Metadata Architectures and Applications	Metadata
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 740: Digital Libraries: Principles and Applications	Metadata
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 752: Digital Preservation and Access	Digital preservation, Metadata
North Carolina at Chapel Hill, University of (Continued accreditation)	INLS 756: Data Curation and Management	Metadata
North Carolina at Greensboro, The University of (Continued accreditation)	LIS 643: Metadata	Metadata
North Carolina at Greensboro, The University of (Continued accreditation)	LIS 644: Digital Libraries	Digital preservation, File format sustainability
North Carolina Central University (Continued accreditation)	LSIS 5442: Network Security	Information security
North Carolina Central University (Continued accreditation)	LSIS 5452: Advanced Data Base Systems	Information security, Storage
North Carolina Central University (Continued accreditation)	LSIS 5820: Meta-Data Analysis	Metadata
North Texas, University of (Continued accreditation)	SLIS 5223: Metadata and Networked Information Organization/Retrieval	Metadata

North Texas, University of (Continued accreditation)	SLIS 5230: Records Management	Digital preservation, Information security, Storage
North Texas, University of (Continued accreditation)	SLIS 5841: Digital Curation Fundamentals	Digital preservation, Storage
North Texas, University of (Continued accreditation)	SLIS 5842: Digital Curation Tools and Applications	Digital preservation, Metadata
North Texas, University of (Continued accreditation)	SLIS 5843: Preservation Planning and Implementation for Digital Curation	Digital preservation
North Texas, University of (Continued accreditation)	SLIS 5844: Advanced Topics in Digital Curation	Digital preservation
Oklahoma, University of (Continued accreditation)	LIS 5653: Preservation of Information Materials	Digital preservation
Oklahoma, University of (Continued accreditation)	LIS 5343: Archival Concepts and Traditions	Digital preservation
Oklahoma, University of (Continued accreditation)	LIS 5453: Digital Collection	Storage
Oklahoma, University of (Continued accreditation)	LIS 5473: Document and Records Management	Digital preservation, Storage
Oklahoma, University of (Continued accreditation)	LIS 5633: Design and Implementation of Web-based Information Services	Storage
Oklahoma, University of (Continued accreditation)	LIS 5683: Database Design for Information Organizations	Information security, Storage
Pittsburgh, University of (Continued accreditation)	LIS 2220: Archives and Records Management	Digital preservation
Pittsburgh, University of (Continued accreditation)	LIS 2227: Photographic Archives	Digital preservation, Storage
Pittsburgh, University of (Continued accreditation)	LIS 2230: Records and Information Management	Metadata
Pittsburgh, University of (Continued accreditation)	LIS 2407: Metadata	Metadata
Pittsburgh, University of (Continued accreditation)	LIS 2600: Introduction to Information Technologies	Information security
Pittsburgh, University of (Continued accreditation)	LIS 2610: Library and Archival Computing	Digital preservation
Pittsburgh, University of (Continued accreditation)	LIS 2672: Technologies & Services for Digital Data	Digital preservation
Pittsburgh, University of (Continued accreditation)	LIS 2674: Preserving Digital Culture	Digital preservation

Pittsburgh, University of (Continued accreditation)	LIS 2677: Research Data Infrastructure	Digital preservation, Storage
Pratt Institute (Conditional accreditation)	LIS 632: Conservation & Preservation	Digital preservation
Pratt Institute (Conditional accreditation)	LIS 647: Visual Resources Management	Digital preservation, Metadata
Pratt Institute (Conditional accreditation)	LIS 650: Principles of Records Management	Information security
Pratt Institute (Conditional accreditation)	LIS 655: Digital Preservation and Curation	Digital preservation
Pratt Institute (Conditional accreditation)	LIS 663: Metadata	Metadata
Pratt Institute (Conditional accreditation)	LIS 665-01: Projects in Digital Archives	Metadata, Storage
Pratt Institute (Conditional accreditation)	LIS 668: Projects in Moving Image and Sound Archives	Digital preservation
Pratt Institute (Conditional accreditation)	LIS 669-01: Digital Asset Management	Digital preservation
Pratt Institute (Conditional accreditation)	LIS 693: Digital Libraries	Digital preservation
Pratt Institute (Conditional accreditation)	LIS 697: Digital Asset Management	Digital preservation
Queens College, CUNY (Continued accreditation)	LBSCI 729: Metadata for Digital Resources	Metadata
Queens College, CUNY (Continued accreditation)	LBSCI 733: Preservation of Cultural Heritage Materials.	Digital preservation
Queens College, CUNY (Continued accreditation)	LBSCI 736: Records Management.	Digital preservation, Storage
Queens College, CUNY (Continued accreditation)	LBSCI 752: Digital Preservation	Digital preservation
Queens College, CUNY (Continued accreditation)	LBSCI 757: Introduction to Digital Imaging.	Digital preservation, File format sustainability, Metadata
Rhode Island, University of (Continued accreditation)	LSC 562: Digital Archives and Preservation	Digital preservation
Rutgers, The State University of New Jersey (Continued accreditation)	LIS 524: Metadata for the Information Professional	Metadata
Rutgers, The State University of New Jersey (Continued accreditation)	LIS 534: Records Management	Storage

Rutgers, The State University of New Jersey (Continued accreditation)	LIS 556: Preservation of Library and Archival Materials	Digital preservation
Rutgers, The State University of New Jersey (Continued accreditation)	LIS 560: Fundamentals of Big Data Curation and Management	Digital preservation
San Jose State University (Continued accreditation)	INFO 247: Vocabulary Design	Metadata
San Jose State University (Continued accreditation)	INFO 256: Archives and Manuscripts	Digital preservation
San Jose State University (Continued accreditation)	INFO 259: Preservation Management	Digital preservation
San Jose State University (Continued accreditation)	INFO 282: Seminar in Library Management - Digital Asset Management	Digital preservation, Information security, Metadata
San Jose State University (Continued accreditation)	INFO 284: Seminar in Archives and Records Management	Digital preservation, File fixity & data integrity, Information security, Metadata
San Jose State University (Continued accreditation)	INFO 284-13: Seminar in Archives and Records Management: tools services & methodologies for digital curation	Digital preservation
San Jose State University (Continued accreditation)	INFO 293: Introduction to Data Networking	Information security
San Jose State University (Continued accreditation)	LIBR 257: Records Management	Digital preservation
San Jose State University (Continued accreditation)	LIBR 284: Seminar in Archives and Records Management: digitization & digital preservation	File format sustainability, Metadata
San Jose State University (Continued accreditation)	LIBR 284: Seminar in Archives and Records Management: curation of new digital media	Digital preservation
San Jose State University (Continued accreditation)	LIBR 284-03: Seminar in Archives and Records Management: digital curation	Digital preservation
San Jose State University (Continued accreditation)	LIBR 287: Digital Libraries	Digital preservation
San Jose State University (Continued accreditation)	MARA 284: Enterprise Content Management and Digital Preservation	Digital preservation
San Jose State University (Continued accreditation)	MARA 284-10: Seminar in Archives and Records Management: born digital	Digital preservation
Simmons College (Continued accreditation)	LIS 415: Information Organization	Metadata

Simmons College (Continued accreditation)	LIS 439: Preservation Management	Digital preservation
Simmons College (Continued accreditation)	LIS 445: Metadata	Metadata
Simmons College (Continued accreditation)	LIS 448: Digital Stewardship	Digital preservation
Simmons College (Continued accreditation)	LIS 456: Managing Records in Electronic Environments	Digital preservation
Simmons College (Continued accreditation)	LIS 462: Digital Libraries	Digital preservation
Simmons College (Continued accreditation)	LIS 489: Technical Foundations for Information Science	File format sustainability
South Carolina, University of (Continued accreditation)	SLIS 725: Digital Libraries	Digital preservation, Storage
South Carolina, University of (Continued accreditation)	SLIS 735: Metadata	Metadata
Southern Mississippi, The University of (Continued accreditation)	LIS 646: Special Collections and Archives	Digital preservation
Southern Mississippi, The University of (Continued accreditation)	LIS 652: Metadata	Metadata
St. Catherine University (Continued accreditation)	LIS 7130: Preservation Management	Digital preservation
St. Catherine University (Continued accreditation)	LIS 7530: Internet Fundamentals and Design	Information security
St. Catherine University (Continued accreditation)	LIS 7590: Digital Libraries	Digital preservation
St. Catherine University (Continued accreditation)	LIS 8820: Metadata for Internet Resources	Metadata
St. John's University (Continued accreditation)	LIS 230: Intro to Digital Libraries	Digital preservation, File format sustainability, Metadata
Syracuse University (Continued accreditation)	IST 622: Introduction to Preservation of Cultural Heritage	Digital preservation
Syracuse University (Continued accreditation)	IST 624: Preservation of Library and Archival Collections	Digital preservation
Syracuse University (Continued accreditation)	IST 628: Organization and Management of Archival Collections	File format sustainability, Information security, Metadata

Syracuse University (Continued accreditation)	IST 676: Foundations of Digital Data	Digital preservation
Syracuse University (Continued accreditation)	IST 677: Creating, Managing and Preserving Digital Assets	Digital preservation
Syracuse University (Continued accreditation)	IST 724: Database Security	Information security
Tennessee, University of (Continued accreditation)	562: Digital Curation	Digital preservation
Tennessee, University of (Continued accreditation)	564: Archives and Records Management	Digital preservation, File format sustainability, Storage
Tennessee, University of (Continued accreditation)	585: Information Technologies	Digital preservation, Storage
Texas at Austin, University of (Continued accreditation)	INF 292K: Digital Archiving and Preservation	Digital preservation, Storage
Texas at Austin, University of (Continued accreditation)	INF 343C: Information Organization and Access	Metadata
Texas at Austin, University of (Continued accreditation)	INF 382R: Intro to Scientific Data Informatics	Digital preservation
Texas at Austin, University of (Continued accreditation)	INF 383H: Intro to digital humanities	Digital preservation
Texas at Austin, University of (Continued accreditation)	INF 384M: Topics in Description and Metadata	Metadata
Texas at Austin, University of (Continued accreditation)	INF 384R: Digital Repositories	Digital preservation, Metadata
Texas at Austin, University of (Continued accreditation)	INF 384W: Descriptive Cataloging and Metadata	Metadata
Texas at Austin, University of (Continued accreditation)	INF 385R: Survey of Digitization	Digital preservation, File format sustainability, Metadata
Texas at Austin, University of (Continued accreditation)	INF 385S: Digital Libraries	Metadata
Texas at Austin, University of (Continued accreditation)	INF 385W: Security Informatics	Information security
Texas at Austin, University of (Continued accreditation)	INF 389G: Intro to Electronic and Digital Records	Digital preservation
Texas at Austin, University of (Continued accreditation)	INF 392H: Creating Sustainable Digital Collections	Digital preservation, Metadata
Texas at Austin, University of (Continued accreditation)	INF 392L: Introduction to Audio Preservation and Reformatting	Digital preservation

Texas at Austin, University of (Continued accreditation)	INF 392M: Advanced Audio Preservation and Reformatting	Digital preservation, File format sustainability
Texas at Austin, University of (Continued accreditation)	INF 392P: The Politics of Preservation	Digital preservation
Texas at Austin, University of (Continued accreditation)	INF389K: Life Cycle Metadata for Digital Objects	Metadata
Texas Woman's University (Continued accreditation)	LS 5013: Information Organization and Retrieval.	Metadata
Texas Woman's University (Continued accreditation)	LS 5403: Library Technology Systems.	Metadata
Valdosta State University (Continued accreditation)	MLIS 7330: Metadata and Advanced Cataloging	Metadata
Valdosta State University (Continued accreditation)	MLIS 7440: Electronic Resources in Libraries	Digital preservation
Valdosta State University (Continued accreditation)	MLIS 7500: Computer Applications for Information Professionals (delisted effective Spring 16)	Information security
Valdosta State University (Continued accreditation)	MLIS 7505: Applied Technologies in Library Practice	Information security, Storage
Valdosta State University (Continued accreditation)	MLIS 7580: Digital Libraries	Digital preservation, Metadata
Valdosta State University (Continued accreditation)	MLIS-7730: Preservation	Digital preservation
Washington, University of (Continued accreditation)	LIS 530: Organization of Information and Resources	Metadata
Wayne State University (Continued accreditation)	LIS 7450: Digital Imaging	Digital preservation, Metadata
Wayne State University (Continued accreditation)	LIS 7740: Archives and Libraries in the Digital World	Storage
Wayne State University (Continued accreditation)	LIS 7900: Digital Libraries	Digital preservation, Metadata
Wayne State University (Continued accreditation)	LIS 7910: Digital Curation and Preservation	Digital preservation, File fixity & data integrity, Metadata
Wayne State University (Continued accreditation)	LIS 7910: Metadata in Theory and Practice	Metadata
Wisconsin-Madison, University of (Continued accreditation)	LIS 341: Topics in Information Studies - Technological Aspects	Digital preservation

Wisconsin-Madison, University of (Continued accreditation)	LIS 351: Introduction to Digital Information	Metadata
Wisconsin-Madison, University of (Continued accreditation)	LIS 616: Records Management	Digital preservation
Wisconsin-Madison, University of (Continued accreditation)	LIS 668: Digital Curation	Digital preservation, Metadata
Wisconsin-Madison, University of (Continued accreditation)	LIS 853: Metadata Standards and Applications	Metadata
Wisconsin-Milwaukee, University of (Continued accreditation)	583: Survey of Information Security	Information security
Wisconsin-Milwaukee, University of (Continued accreditation)	656: Electronic Documents and Records Management	Digital preservation, File format sustainability, Metadata
Wisconsin-Milwaukee, University of (Continued accreditation)	714: Metadata	Metadata
Wisconsin-Milwaukee, University of (Continued accreditation)	753: Preserving Information Media.	Digital preservation

Appendix B

Table 6. Courses Covering File Format Sustainability

Institution	Course Title	Digital Preservation Concepts
Albany, University at, SUNY	IST 653: Digital Libraries	Digital preservation, File format sustainability
California, Los Angeles, University of	MIAS 298: (Special Topics) Digital Asset Management	Digital preservation, File format sustainability
Catholic University of America, The	LSC 652: Foundations of Digital Libraries	Digital preservation, File format sustainability
Denver, University of	LIS 4804: Digital Objects & Collections	Digital preservation, File format sustainability, Metadata
Denver, University of	LIS 4820: Digitization	Digital preservation, File format sustainability, Metadata
Hawaii, University of	unknown #: Moving Image Archives	Digital preservation, File format sustainability, Metadata
Long Island University	LIS 706: Digital Preservation	Digital preservation, File format sustainability, Metadata
Long Island University	LIS 716: Audio Preservation	File format sustainability, Metadata
Louisiana State University	LIS 7410: Digital Libraries	Digital preservation, File format sustainability, Metadata

N. Carolina at Greensboro, The University of	LIS 644: Digital Libraries	Digital preservation, File format sustainability, Metadata
Queens College, CUNY	LBSCI 757: Introduction to Digital Imaging.	Digital preservation, File format sustainability, Metadata
San Jose State University	LIBR 284: Seminar in Archives and Records Management: digitization and digital preservation	File format sustainability, Metadata
Simmons College	LIS 489: Technical Foundations for Information Science	File format sustainability, Storage
St. John's University	LIS 230: Intro to Digital Libraries	Digital preservation, File format sustainability, Storage
Syracuse University	IST 628: Organization and Management of Archival Collections	File format sustainability, Metadata, Storage
Tennessee, University of	564: Archives and Records Management	Digital preservation, File format sustainability, Information Security, Metadata
Texas at Austin, University of	INF 392M: Advanced Audio Preservation and Reformatting	Digital preservation, File format sustainability, Metadata
Texas at Austin, University of	INF 385R: Survey of Digitization	Digital preservation, File format sustainability
Wisconsin-Milwaukee, University of	656: Electronic Documents and Records Management	Digital preservation, File format sustainability

Table 7. Courses Covering Information Security

Institution	Course	Digital Preservation Concepts
Albany, University at, SUNY	IIST 666: Network and Systems Security	Information security
Albany, University at, SUNY	IST 523: Fundamentals of Information Technology	Information security
California, Los Angeles, University of	274: Database Management Systems	Information security
Denver, University of	LIS 4050: Library and Information Technologies	Information security
Drexel University	INFO 517: Principles of Cybersecurity	Information security
Florida State University	LIS 5775: Information Security	Information security
Kentucky, University of	LIS 637: Information Technology	Information security
Maryland, University of	INST 641: Policy Issues in Digital Curation	Digital preservation, File fixity & data integrity, Information security

Maryland, University of	INST 611: Privacy and Security in a Networked World	Information security
Michigan, University of	SI 502: Networked Computing Storage Communication and Processing	Information security
North Carolina at Chapel Hill, University of	INLS 566: Information Assurance (3 credits)	File fixity & data integrity, Information security
North Carolina Central University	LSIS 5452: Advanced Data Base Systems	Information security
North Carolina Central University	LSIS 5442: Network Security	Information security
North Texas, University of	SLIS 5230: Records Management	Digital preservation, Information security
Oklahoma, University of	LIS 5683: Database Design for Information Organizations	Information security
Pittsburgh, University of	LIS 2600: Introduction to Information Technologies	Information security
Pratt Institute	LIS 650: Principles of Records Management	Information security
San Jose State University	INFO 284: Seminar in Archives and Records Management	Digital preservation, File fixity & data integrity, Information security, Metadata
San Jose State University	INFO 282: Seminar in Library Management - Digital Asset Management	Digital preservation, Information security, Metadata
San Jose State University	INFO 293: Introduction to Data Networking	Information security
St. Catherine University	LIS 7530: Internet Fundamentals and Design	Information security
Syracuse University	IST 628: Organization and Management of Archival Collections	File format sustainability, Information security, Metadata
Syracuse University	IST 724: Database Security	Information security
Texas at Austin, University of	INF 385W: Security Informatics	Information security
Valdosta State University	MLIS 7505: Applied Technologies in Library Practice	Information security
Valdosta State University	MLIS 7500: Computer Applications for Information Professionals (to be delisted effective Spring 16)	Information security
Wisconsin-Milwaukee, University of	583: Survey of Information Security	Information security

Table 8. Metadata Courses by Institution

Institution	Course	Digital Preservation Concepts
Alabama, University of	LS 566: Metadata	Metadata
California, Los Angeles, University of	IS 464: Metadata	Metadata
Catholic University of America, The	LSC 615: Metadata	Metadata
Denver, University of	LIS 4404: Metadata Architectures	Metadata
Dominican University	LIS 882: Metadata for digital resources	Metadata
Drexel University	INFO 662: Metadata and Resource Description	Metadata
Emporia State University	LI 883: Introduction to Metadata	Metadata
Emporia State University	LI 884: Advanced Metadata Applications	Metadata
Florida State University	LIS 5787: Fundamentals of Metadata Theory and Practice	Metadata
Hawaii, University of	LIS 694: Metadata Management in Memory Institutions	Metadata
Illinois at Urbana-Champaign, University of	LIS 562: Metadata in theory and practice	Metadata
Illinois at Urbana-Champaign, University of	LIS 507: Intro to Bibliographic Metadata	Metadata
Indiana University	Z634: Metadata	Metadata
Iowa, University of	SLIS:6335: Metadata Theories and Applications	Metadata
Kent State University	LIS 60637: Metadata Architecture and Implementation	Metadata
Long Island University	LIS 763: Metadata for Digital Libraries	Metadata
North Carolina at Chapel Hill, University of	INLS 720: Metadata Architectures and Applications	Metadata
North Carolina at Greensboro, The University of	LIS 643: Metadata	Metadata
North Carolina Central University	LSIS 5820: Meta-Data Analysis	Metadata

North Texas, University of	SLIS 5223: Metadata and Networked Information Organization/Retrieval	Metadata
Pittsburgh, University of	LIS 2407: Metadata	Metadata
Pratt Institute	LIS 663: Metadata	Metadata
Queens College, CUNY	LBSCI 729: Metadata for Digital Resources	Metadata
Rutgers, The State University of New Jersey	LIS 524: Metadata for the Information Professional	Metadata
Simmons College	LIS 445: Metadata	Metadata
South Carolina, University of	SLIS 735: Metadata	Metadata
Southern Mississippi, The University of	LIS 652: Metadata	Metadata
St. Catherine University	LIS 8820: Metadata for Internet Resources	Metadata
Texas at Austin, University of	INF389K: Life Cycle Metadata for Digital Objects	Metadata
Texas at Austin, University of	INF 384M: Topics in Description and Metadata	Metadata
Texas at Austin, University of	INF 384W: Descriptive Cataloging and Metadata	Metadata
Valdosta State University	MLIS 7330: Metadata and Advanced Cataloging	Metadata
Wayne State University	LIS 7910: Metadata in Theory and Practice	Metadata
Wisconsin-Madison, University of	LIS 853: Metadata Standards and Applications	Metadata
Wisconsin-Milwaukee, University of	714: Metadata	Metadata

Table 9. Courses Covering Storage

Institution	Course	Digital Preservation Concepts
California, Los Angeles, University of	MIAS 298: (Special Topics) Digital Asset Management	Digital preservation, File format sustainability, Metadata, Storage

California, Los Angeles, University of	274: Database Management Systems	Information security, Storage
Catholic University of America, The	LSC 654: Database Management	File fixity & data integrity, Storage
Dominican University	LIS 751: Database Management	Storage
Dominican University	LIS 750: Information Storage and Retrieval	Storage
Drexel University	INFO 642: Managing Digital Collections and Repositories	Storage
Emporia State University	LI 862: Current Issues in Technology	Storage
Hawaii, University of	LIS 670: Introduction to Information Science and Technology	Storage
Iowa, University of	SLIS:6330/021:240 Archives and Media	Storage
Kentucky, University of	LIS 637: Information Technology	Information security, Storage
Kentucky, University of	LIS 636: Foundations of Information Technology	Storage
Kentucky, University of	LIS 638: Internet Technologies and Information Services	Storage
Long Island University	LIS 706: Digital Preservation	Digital preservation, File format sustainability, Storage
Long Island University	LIS 508: Technology for Information Management	Storage
Maryland, University of	LBSC 682: Management of Electronic Records & Information	Digital preservation, Storage
Michigan, University of	SI 678: Preserving Sound and Motion	Storage
North Carolina at Chapel Hill, University of	INLS 561: Digital Forensics for Curation of Digital Collections	Digital preservation, File fixity & data integrity, Storage
North Carolina Central University	LSIS 5452: Advanced Data Base Systems	Information security, Storage
North Texas, University of	SLIS 5230: Records Management	Digital preservation, Information security, Storage
North Texas, University of	SLIS 5841: Digital Curation Fundamentals	Digital preservation, Storage

Oklahoma, University of	LIS 5473: Document and Records Management	Digital preservation, Storage
Oklahoma, University of	LIS 5683: Database Design for Information Organizations	Information security, Storage
Oklahoma, University of	LIS 5453: Digital Collection	Storage
Oklahoma, University of	LIS 5633: Design and Implementation of Web-based Information Services	Storage
Pittsburgh, University of	LIS 2227: Photographic Archives	Digital preservation, Storage
Pittsburgh, University of	LIS 2677: Research Data Infrastructure	Digital preservation, Storage
Pratt Institute	LIS 665-01: Projects in Digital Archives	Metadata, Storage
Queens College, CUNY	LBSCI 736: Records Management.	Digital preservation, Storage
Rutgers, The State University of New Jersey	LIS 534: Records Management	Storage
South Carolina, University of	SLIS 725: Digital Libraries	Digital preservation, Storage
Tennessee, University of	564: Archives and Records Management	Digital preservation, File format sustainability, Storage
Tennessee, University of	585: Information Technologies	Digital preservation, Storage
Texas at Austin, University of	INF 292K: Digital Archiving and Preservation	Digital preservation, Storage
Valdosta State University	MLIS 7505: Applied Technologies in Library Practice	Information security, Storage
Wayne State University	LIS 7740: Archives and Libraries in the Digital World	Storage